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(54) BRAILLE FORMING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To perform the input and output operation at an operating speed corresponding to a braille operator, by changing a time interval of a braille forming means which forms the irregular pattern of braille on the basis of the braille forming information, by a changing means.

SOLUTION: An input and output device 11 for visual handicapped person, which is connected with an automatic teller's machine (ATM), comprises a touch sense display 13 forming an irregular pattern of braille by rising and setting a number of dot pins 12... arranged lengthwise and breadth wise. An acceleration adjusting key 14 for accelerating the time interval every formation of braille, and a reduction adjusting key 15 for reducing the formation time. The time interval for forming the braille, is adjusted by the acceleration or reduction through the adjusting keys 14, 15 to switch the output speed of the braille, so that the forming speed is adjusted suitably for the reading by the visual handicapped person, when the visual handicapped person touches an operation panel of the input and output device by finger tips 16 to change the reading speed.

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CLAIMS

[Claim(s)]

[Claim 1] Braille-points generation equipment equipped with a Braille-points generation means to generate the concavo-convex pattern of Braille points based on the creation information of Braille points, and a modification means to change spacing between generate times of the above-mentioned Braille-points generation means.

[Claim 2] Braille-points generation equipment equipped with a Braille-points generation means to generate the concavo-convex pattern of Braille points based on the character string information for every group which a storage means memorizes, and a selection means to choose the character string information for every group of the Braille points which the above-mentioned Braille-points generation means generates.

[Claim 3] Braille-points generation equipment equipped with a Braille-points generation means generate the concavo-convex pattern of Braille points based on the creation information of Braille points, a detection means detect the contact location of the finger of the Braille-points user who touches a Braille-points actuation side, and a Braille-points repositioning means generate the Braille points of the above-mentioned Braille-points generation means in the contact location of the finger which the above-mentioned detection means detected.

[Claim 4] A Braille-points generation means is Braille-points generation equipment according to claim 3 which set up more widely than the Braille-points generation field of criteria the Braille-points generation field on a Braille-points actuation side.

[Claim 5] Braille-points generation equipment which generates the handwriting alphabetic character inputted by pen point input means to input a handwriting alphabetic

character, Braille-points generation means to generate the concavo-convex pattern of Braille points, and the above-mentioned pen point input means in Braille points with the above-mentioned Braille-points generation means.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to still more detailed Braille-points generation equipment with high a visually impaired person's operability ability and actuation dependability about Braille-points generation equipment with which the reception panel of various equipments, such as ATM, an automated-teller, an automatic ticket vending machine, an automatic-reset machine, and an information retrieval machine, is equipped.

[0002]

[Description of the Prior Art] When it generally applies to the I/O device, which made a visually impaired person's input/output operation possible, for example, ATM (ATM), an automatic ticket vending machine, etc., the electronic intelligence outputted to the actuation side on this tactile-sense display using the tactile-sense display which outputs Braille points comes to hand, and the Braille-points input of the dealings information is carried out, and dealings use is carried out.

[0003] However, since the input/output operation of this kind of Braille points had the fixed processing speed for every Braille points, it did not sense late for known **** / that he cannot fully understand the contents of a Braille-points output], and similarly, since individual difference was large, the read rate and input operating

speed of Braille points differed from each other greatly for every visually impaired person, and satisfying dealings actuation of alter operation according to a visually impaired person was not completed.

[0004] Moreover, the input/output operation using voice -- although -- although it thinks, the present condition is the contents which be not asked to men, such as personal identification number metallurgy frame information, depending on use models, such as ATM, being reported, and the fault it is hard coming to hear when a circumference environment's is noisy arising, and having not resulted in spread.

[0005]

[Problem(s) to be Solved by the Invention] Then, even if this invention is an unfamiliar visually impaired person and a skillful visually impaired person, it aims at offer of the Braille-points generation equipment, which has the Braille-points rate adjustable function which, could be made to carry out input/output operation in the operating speed according to that Braille-points operator.

[0006]

[Means for Solving the Problem] Invention according to claim 1 is characterized by having a Braille-points generation means to generate the concavo-convex pattern of Braille points based on the creation information of Braille points, and a modification means to change spacing between generate times of this Braille-points generation means.

[0007] Invention according to claim 2 is characterized by having a Braille-points generation means to generate the concavo-convex pattern of Braille points based on the character string information for every group which a storage means memorizes, and a

selection means to choose the character string information for every group of the Braille points which this Braille-points generation means generates.

[0008] Invention according to claim 3 is characterized by to have a Braille-points generation means generate the concavo-convex pattern of Braille points based on the creation information of Braille points, a detection means detect the contact location of the finger of the Braille-points user who touches a Braille-points actuation side, and a Braille-points repositioning means generate the Braille points of the above-mentioned Braille-points generation means in the contact location of the finger which this detection means detected.

[0009] Invention according to claim 4 is characterized by having a Braille-points generation means by which the Braille-points generation field on a Braille-points actuation side was set up more widely than the Braille-points generation field of criteria.

[0010] Invention according to claim 5 is characterized by generating the handwriting alphabetic character inputted by pen point input means to input a handwriting alphabetic character, Braille-points generation means to generate the concavo-convex pattern of Braille points, and the above-mentioned pen point input means in Braille points with the above-mentioned Braille-points generation means.

[0011]

[Function] According to this invention, a modification means changes spacing between generate times of a Braille-points generation means to generate the concavo-convex pattern of Braille points based on the creation information of Braille points.

[0012] Moreover, a selection means chooses the character string information for every group of the Braille points which a Braille-points generation means generates.

[0013] Furthermore, if a Braille-points user's finger touches a Braille-points actuation side, a detection means will detect the contact location and a Braille-points repositioning means will generate Braille points with a Braille-points generation means in the contact location of a finger based on this.

[0014] Moreover, Braille points are generated in the location as which the Braille-points generation means was specified on the Braille-points actuation side with a field larger than the Braille-points generation field of criteria.

[0015] Furthermore, a Braille-points generation means to generate the concavo-convex pattern of Braille points generates the handwriting alphabetic character inputted by the pen point input means in Braille points.

[0016]

[Effect of the Invention] Consequently, since spacing between generate times of the Braille points which carry out sequential generation on a Braille-points actuation side can be changed, it can change into the Braille-points generation rate according to each visually impaired person from whom the understanding rate and operating speed of Braille points differ. For this reason, efficient reception correspondence according to all visually impaired persons' manipulative capability can be performed. Moreover, if it constitutes so that it can be dealt with for the character string information for every groups, such as "welcome", a "name of the station", and the "amount of money", it will become unnecessary to carry out single-character [every] assignment actuation, and read effectiveness will also improve.

[0017] Furthermore, if Braille points are generated in the location where the finger touched when a visually impaired person does Braille-points use in contact with a

Braille-points actuation side If a visually impaired person can read Braille points to the contact and coincidence to a Braille-points actuation side, it is not necessary to look for a Braille-points location, and efficient Braille-points use can be aimed at and a Braille-points actuation side is set as a wide area Correspondence can be taken immediately in the location of the arbitration in which the visually impaired person did contact use, and it becomes the actuation side excellent in the sex corresponding to reception with a visually impaired person, and is suitable also for the generation of character string information which carries out a package expression for every group further.

[0018] Furthermore, if it enables it to change into Braille points the alphabetic character written by hand, since a visually impaired person can carry out alter operation of various information, such as an alphabetic character and a figure, he can acquire abundant information equivalent to a healthy person easily, and can apply to various kinds of automatic dealings machines etc. widely as Braille-points generation equipment suitable for a visually impaired person.

[0019]

[Example] One example of this invention is explained in full detail based on a drawing below.

[1st example] drawing 1 shows I/O device 11 for visually impaired persons by which connection use is carried out at ATM. The tactile-sense display 13 which I/O device 11 for these visually impaired persons makes dot pin 12 -- of a large number arranged in all directions appear frequently, and generates the concavo-convex pattern of Braille points, The moderation adjustment key 15 which makes late the acceleration adjustment key 14 which speeds up spacing between generate times for the Braille-points generation of

every, and spacing between generate times is had and constituted. In a visually impaired person's touching by the fingertip 16, reading on the actuation side of this equipment 11, and operating it to utilization time and changing a read rate, spacing between generate times of Braille points is adjusted or moderation adjusted by the adjustment keys 14 and 15, and it adjusts the output rate of Braille points to a change and the generation rate suitable for a visually impaired person's read.

[0020] Drawing 2 shows the control circuit block diagram of I/O device 11 for visually impaired persons, and CPU21 controls each circuit apparatus of the key matrix 23, the tactile-sense display 13, the adjustment keys 14 and 15, a timer 24, a dc-battery 25, and a communication device 26 in accordance with the program stored in ROM22, and memorizes the control data possible [read-out] by RAM27.

[0021] The key matrix 23 specifies the output timing of the Braille-points data changed into Braille points while modification of a Braille-points output rate is permitted by the key matrix function and a timer 24 clocks the adjustment time amount of the acceleration adjustment key 14 and the moderation adjustment key 15.

[0022] A communication device 26 makes communication link connection with CPU30 of other I/O devices 29 through other external communication devices 28, and receives the alphabetic data which should transmit and receive with other CPUs30 and should be changed into Braille points.

[0023] Moreover, CPU21 is the dot pin 12 of the tactile-sense display 13, in case the output control of the concavo-convex pattern of Braille points is carried out. – A visually impaired person reads continuously in the feel of the fingertip 16 the concavo-convex pattern of the Braille points which CPU21 orders it by making dot pin 12-- appear

frequently automatically upwards, where press maintenance of the fingertip 16 is carried out lightly, and switching a concavo-convex pattern to it.

[0024] Moreover, since spacing between generate times of the tactile-sense display 13 on which CPU21 generates the concavo-convex pattern of Braille points at this time can be accelerated or slowed down, as an unfamiliar visually impaired person is made late and can read spacing between generate times certainly, a setting change is made, and the familiar visually impaired person can speed up spacing between generate times, and can read in a short time. Thus, since it can change into the Braille-points generation rate according to each visually impaired person from whom the understanding rate of Braille points differs, efficient reception correspondence suitable for all visually impaired persons' manipulative capability can be performed.

[0025] Thus, processing actuation of constituted I/O device 11 for visually impaired persons is explained with reference to the flow chart of drawing 3. When the visually impaired person familiar to the handling of this I/O device 11 speeds up a Braille-points generation rate now, the depression of the acceleration adjustment key 14 is carried out (step n1 -n2).

[0026] Based on the depression of this acceleration adjustment key 14, as CPU21 shortens spacing between generate times of Braille points, it carries out a timer setup (step n3). On the other hand, CPU21 incorporates Braille-points data, such as a graphic-character code, from other I/O devices 29 which carry out connection correspondence (step n4 -n6). CPU21 carries out the Braille-points output of this incorporated Braille-points data at the adjusted quick setting rate, and the familiar visually impaired person reads this well for a short time (step n7 -n8).

[0027] On the other hand, when an unfamiliar visually impaired person makes a Braille-points generation rate late, as CPU21 lengthens spacing between generate times of Braille points, it carries out a timer setup (step n10), and after a setup carries out the Braille-points output of the graphic character at the adjusted comparatively loose setting rate, and it makes a visually impaired person to press the moderation adjustment key 15 (step n9), and read it based on the depression of this moderation adjustment key 15 (steps n11-n12).

[0028] [2nd example] drawing 4 shows I/O device 41 for other visually impaired persons of this invention. The tactile-sense display 43 which I/O device 41 for these visually impaired persons makes dot pin 42 -- of a large number arranged in all directions appear frequently, and generates the concavo-convex pattern of Braille points, It has the moderation adjustment key 45 which makes late the acceleration adjustment key 44 which speeds up spacing between generate times for the Braille-points generation of every, and spacing between generate times, and the cursor key 46 which specifies the vertical and horizontal area migration direction.

[0029] The tactile-sense display 43 used here has the Braille-points actuation side of the wide area which carries out Braille-points output permission of the character-string data which combined two or more alphabetic characters, such as "welcome", collectively. A visually impaired person is efficiently told about the character-string data which this expresses for every group unit collectively, a visually impaired person's read rate and improvement in read efficiency are aimed at, and spacing between generate times of Braille points can be sped up by the acceleration adjustment key 44, or it can be made late by the moderation adjustment key 45, and the read rate of Braille points can be changed. Moreover, based on the depression time amount of the cursor key 46 which

specifies the area migration direction in every direction, the coordinate location of the X-axis and a Y-axis is pinpointed, and the Braille-points output of the character-string data of the coordinate location is carried out.

[0030] Drawing 5 showed the detection explanatory view of the finger location when carrying out actuation use of the tactile-sense display 43, this arranged the finger location detection sensor 47 suitable for the text of a package expression of lateral writing of much dot pin 42 -- which arranges oblong and consists of a light emitting diode and photo sensor along with this landscape orientation, and it has the fingertip detection function of carrying out photoelectrical detection in the fingertip 48 of the visually impaired person who did contact use in the tactile-sense display 43.

[0031] Based on detecting this fingertip 48, Braille points are generated in the location where that fingertip touched. Thereby, the read of Braille points can be started in the contact location, and it becomes the actuation side excellent in the sex corresponding to reception with the visually impaired person who can carry out actuation use immediately, without looking for a Braille-points location at the same time a visually impaired person contacts the tactile-sense display 43.

[0032] Moreover, if it sets up widely so that contact correspondence of the tactile-sense display 43 may be carried out in a broader-based area, it is suitable also for generation of the character-string data which can take correspondence immediately in the location of the arbitration in which a visually impaired person does contact use, and carry out the package expression of the transfer information with the aggregate of two or more characters.

[0033] Drawing 6 shows an example of the reception display screen 61 of ATM by which connection use is carried out to I/O device 41 for visually impaired persons, and the character-string data with which it was requested, and sequential transmission was carried out, and the character-string data by which display guidance is carried out in this reception display screen 61 were transmitted to I/O device 41 are changed into Braille points with I/O device 41, and are read and used for a visually impaired person. For example, display guidance of each character-string-data 62 -- of 6 area of "welcome", "it being Ox bank", "payment", "deposit", "inquiry for the balances", and "transfer" is carried out in the reception display screen 61 of ATM, and the designator character string data 63 of the pointer location specified out of this reception display screen 61 is called, and it is outputted to I/O device 41.

[0034] Drawing 7 shows the control circuit block diagram of I/O device 41 for visually impaired persons, and CPU71 controls each circuit apparatus of the key matrix 73, the tactile-sense display 43, a timer 74, a dc-battery 75, the adjustment keys 44 and 45, a cursor key 46, the finger location detection sensor 47, and a communication device 76 in accordance with the program stored in ROM72, and memorizes the control data possible [read-out] by RAM77.

[0035] The key matrix 73 specifies the output timing of the Braille-points data changed into Braille points while modification of a Braille-points output rate is permitted by the key matrix function and a timer 74 clocks the adjustment time amount of the acceleration adjustment key 44 and the moderation adjustment key 45.

[0036] A communication device 76 makes communication link connection with CPU80 of ATM through the communication device 79 of ATM78, and receives the character-

string data which should transmit and receive with this CPU80 and should be changed into Braille points.

[0037] Next, transceiver processing actuation of the character-string data dealt with by ATM78 is explained with reference to the flow chart of drawing 8. In the ATM78 side, CPU80 is setting up and carrying out data control of the coordinate for every character-string data which carried out grouping of two or more alphabetic characters (step n21).

[0038] This detects the lap of the setting processing, and group area and a pointer location of the group area for every character-string data, it usually carried out grouping for every semantics in order to make semantics as a text with the aggregate of two or more characters, and CPU80 has set up area for every group of the (steps n22-n23).

[0039] And when the pointer location specified at the time of a data request is in area, two or more character codes of a group currently assigned to the area are outputted (steps n24-n26).

[0040] Thus, processing actuation of constituted I/O device 41 for visually impaired persons is explained with reference to the flow chart of drawing 9. If the coordinate location of character-string data specified from that direction of a depression and depression time amount when the cursor key 46 of this I/O device 41 was pushed now is called for (steps n31-n33) and this is transmitted to ATM78 If it is in the ATM side, and it judges whether the alphabetic character is developed on the coordinate and an alphabetic character is on this developed coordinate and there is an alphabetic character, I/O device 41 will be answered in those character-string data (steps n34-n35).

[0041] While CPU71 carries out data check of the answered character-string data, it changes into Braille-points string data, and a Braille-points output is carried out in

the location of the finger with which a visually impaired person's fingertip has touched (steps n36-n43).

[0042] Moreover, when a visually impaired person operates the acceleration adjustment key 44 or the moderation adjustment key 45, a Braille-points output is carried out at the Braille-points output rate which the visually impaired person demands (steps n44-n45).

[0043] [3rd example] drawing 10 and drawing 11 show I/O device 101 for other visually impaired persons of this invention. The tactile-sense display 103 which I/O device 101 for these visually impaired persons makes dot pin 102 -- of a large number arranged in all directions appear frequently, and generates the concavo-convex pattern of Braille points, It has the moderation adjustment key 105 which makes late the acceleration adjustment key 104 which speeds up spacing between generate times for the Braille-points generation of every, and spacing between generate times, the trackball 106 which carries out assignment actuation of the vertical and horizontal area migration direction with a finger, and the digitizer 107 which carries out handwriting input permission of a visually impaired person's information.

[0044] The area of the specific direction is specified from the detection data of X shaft-orientations pulse detector 108 and Y shaft-orientations pulse detector 109 by drawing 12's showing the detection explanatory view of the area migration direction of a trackball 106, and holding this trackball 106 in the direction of arbitration in homotopic at rotation freedom, and rotating this trackball 106.

[0045] Moreover, when the index finger and the middle finger are made to correspond to the location of the tactile-sense display 103 in this case, the thumb is made to correspond

to the location of a trackball 106, and the arrangement configuration is carried out so that Braille-points actuation can be carried out in a corresponding state as it is.

[0046] Drawing 13 shows a digitizer 107, applies an electrical potential difference to both the resistance sheet 111,112 that opposite-**(ed) across the tooth space 110, and detects the alphabetic character written by hand through the X coordinate detector 114 and the Y coordinate detector 115 here in the resistance division ratio in the contact 113 of the depression input location of the alphabetic character by which the handwriting input was carried out, or a figure.

[0047] Drawing 14 shows the control circuit block diagram of I/O device 101 for visually impaired persons, and CPU141 controls each circuit apparatus of the key matrix 143, the tactile-sense display 103, a timer 144, a dc-battery 145, the finger location detection sensor 146, the adjustment key 104,105, a trackball 106, a digitizer 107, and a communication device 147 in accordance with the program stored in ROM142, and memorizes the control data possible [read-out] by RAM148.

[0048] The key matrix 143 changes alphabetic data into Braille-points data, and outputs it to the tactile-sense display 103, a timer 144 clocks the adjustment time amount of the acceleration adjustment key 104 and the moderation adjustment key 105, and the finger location detection sensor 146 detects the location of the fingertip of the visually impaired person who did contact use of the tactile-sense display 103.

[0049] A communication device 147 makes communication link connection with CPU151 of other I/O devices 150 through other external communication devices 149, and receives the alphabetic data which should transmit and receive with other CPUs151 and should be changed into Braille points.

[0050] Moreover, in case CPU141 carries out the output control of the concavo-convex pattern of Braille points, the alphabetic character by which the handwriting input was carried out using the digitizer 107 was changed into Braille points, and it has formed it in the tactile-sense display 103 possible [an output]. For this reason, since a visually impaired person can carry out alter operation of various information, such as an alphabetic character and a figure, he can acquire abundant information equivalent to a healthy person easily.

[0051] Thus, processing actuation of constituted I/O device 101 for visually impaired persons is explained with reference to the flow chart of drawing 15 and drawing 16. If rotation actuation of the trackball 106 of this I/O device 101 is carried out If the coordinate location of alphabetic data specified from the actuation direction and a rotation control input is called for (steps n51-n53) and this is transmitted to other I/O devices 150 If it is in this equipment 150 side, and it judges whether the alphabetic character is developed on the coordinate and an alphabetic character is on this developed coordinate and there is an alphabetic character, I/O device 101 will be answered in those character-string data (steps n54-n55).

[0052] Moreover, if a visually impaired person does the handwriting input of the input data using a digitizer 107 at this time, after transmitting this data by which the handwriting input was carried out to other I/O devices 150 and performing data processing according to this transmit data, I/O device 101 is answered again (steps n56-n58).

[0053] While CPU141 carries out data check of the answered alphabetic data, it changes into Braille-points data, and a Braille-points output is carried out in the location of the finger with which a visually impaired person's fingertip has touched (steps n59-n66).

[0054] Moreover, when a visually impaired person operates the acceleration adjustment key 104 or the moderation adjustment key 105, a Braille-points output is carried out at the Braille-points output rate which the visually impaired person demands (steps n67-n68).

[0055] [4th example] drawing 17 shows I/O device 171 for other visually impaired persons of this invention. The tactile-sense display 173 which I/O device 171 for these visually impaired persons makes dot pin 172 -- of a large number arranged in all directions appear frequently, and generates the concavo-convex pattern of Braille points, The moderation adjustment key 175 which makes late the acceleration adjustment key 174 which speeds up spacing between generate times for the Braille-points generation of every, and spacing between generate times, It has the trackball 176 which carries out assignment actuation of the vertical and horizontal area migration direction with a finger, the digitizer 177 which carries out handwriting input permission of a visually impaired person's information, and the loudspeaker 178.

[0056] In this case, by having a loudspeaker 178, voice guidance can be carried out auxiliary or the output guidance which carried out adjustable setting of a tone and the sound volume, and fitted Braille-points actuation of a visually impaired person can be urged.

[0057] As mentioned above, since spacing between generate times of the Braille points which carry out sequential generation on a Braille-points actuation side can be changed, it

can change into the Braille-points generation rate according to each visually impaired person from whom the understanding rate and operating speed of Braille points differ. For this reason, efficient reception correspondence according to all visually impaired persons' manipulative capability can be performed. Moreover, since it can be dealt with the character-string data for every groups, such as "welcome", it becomes unnecessary to carry out single-character [every] assignment actuation, and read effectiveness improves. [0058] Furthermore, since Braille points can be generated in the location where the finger touched when a visually impaired person does Braille-points use in contact with a tactile-sense display, a visually impaired person can read Braille points to the contact and coincidence to a tactile-sense display, does not need to look for a Braille-points location, and can aim at efficient Braille-points use. Moreover, by setting a tactile-sense display as a wide area, correspondence can be taken immediately in the location of the arbitration in which the visually impaired person did contact use, and it becomes the actuation side excellent in the sex corresponding to reception with a visually impaired person, and is suitable also for the generation of character string information which carries out a package expression for every group further.

Furthermore, since the alphabetic character which carried out the handwriting input is convertible for Braille points, a visually impaired person can carry out alter operation of various information, such as an alphabetic character and a figure. For this reason, abundant information equivalent to a healthy person can be acquired easily, and it can apply to various kinds of automatic dealings machines etc. widely as an I/O device suitable for a visually impaired person.

[0059] In correspondence with this invention and the configuration of an above-mentioned example the Braille-points generation equipment of this invention, it corresponds to I/O devices 11 and 41,101,171 for the visually impaired persons of an example. Like the following a Braille-points generation means, a Braille-points actuation side, and a Braille-points generation field it corresponds to the tactile-sense displays 13 and 43,103,173 and the dot pins 12 and 42,102,172 of those. A modification means it corresponds to the acceleration adjustment keys 14 and 44,104,174 and the moderation adjustment keys 15 and 45,105,175. Character string information it corresponds to character-string data 62 and 63. A selection means it corresponds to a cursor key 46 and a trackball 106,176. Detection means it corresponds to the finger location detection sensor 47,146, Braille-points repositioning means corresponds to CPUs 21 and 71,141, and a pen point input means is not limited only to the configuration of the example above-mentioned [** corresponding to a digitizer 107,177, and this invention].

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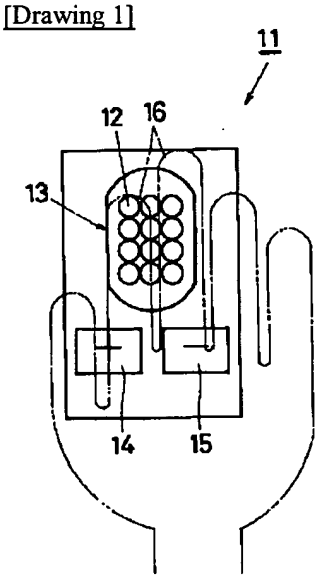
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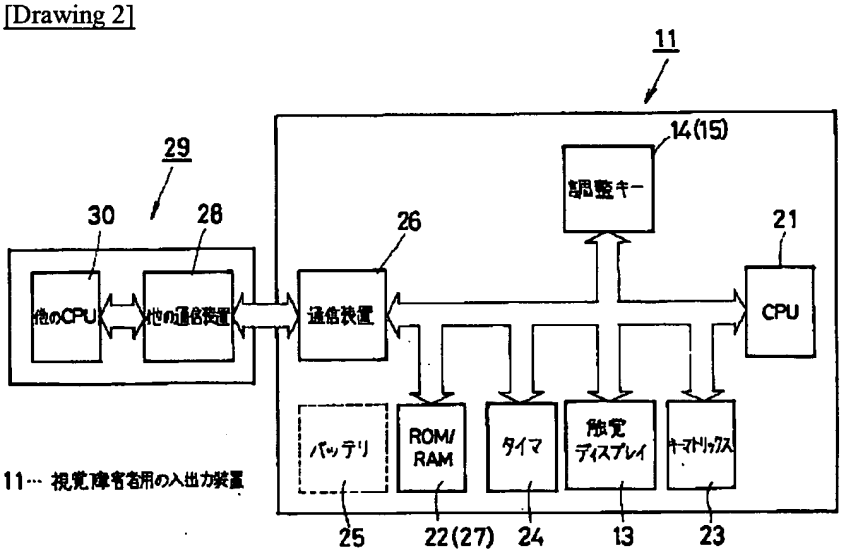
DRAWINGS

[Drawing 1]



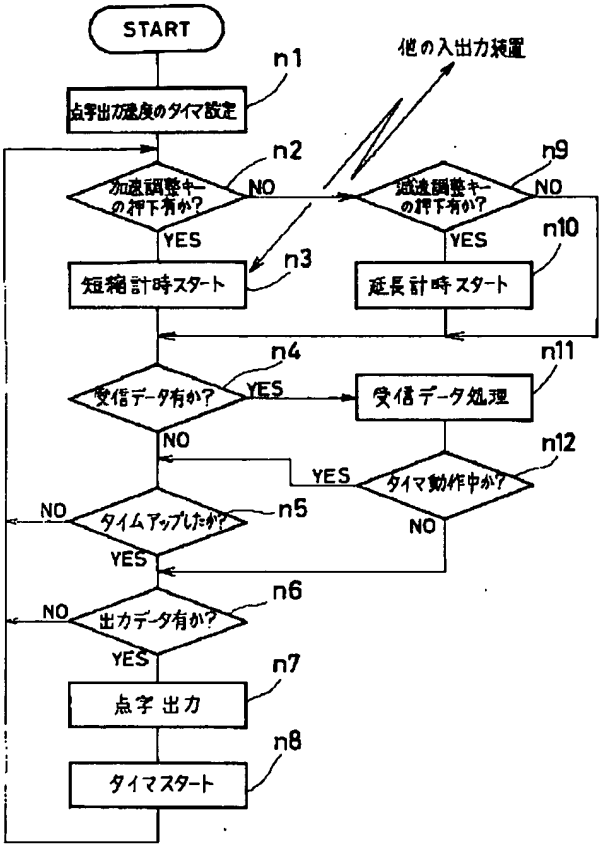
11… 視覚障害者用の入出力装置 14 … 加速調整キー
12… ドットピン 15 … 減速調整キー
13… 触覚ディスプレイ

[Drawing 2]

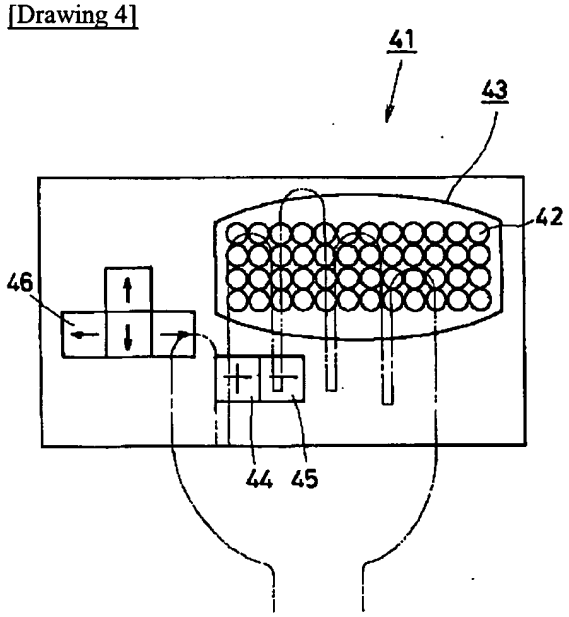


11… 視覚障害者用の入出力装置

[Drawing 3]

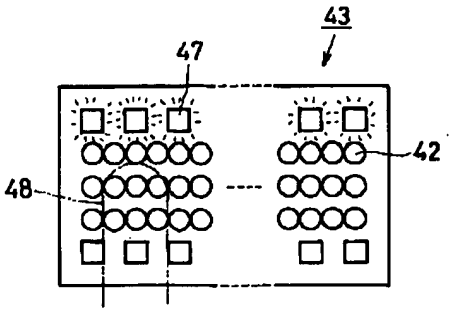


[Drawing 4]



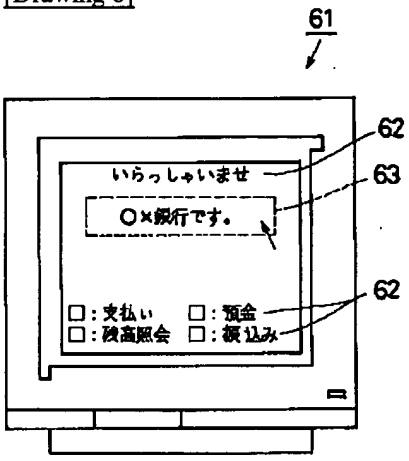
41--視覚障害者用の入出力装置 44--加速調整キー
42--ドットピン 45--減速調整キー
43--触覚ディスプレイ 46--カーソルキー

[Drawing 5]



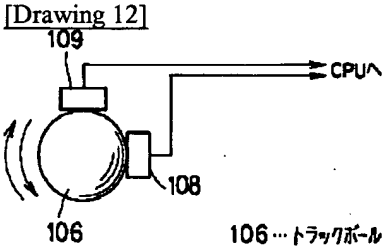
42…ドットピン　　47…指位置検知センサ
43…触覚ディスプレイ

[Drawing 6]



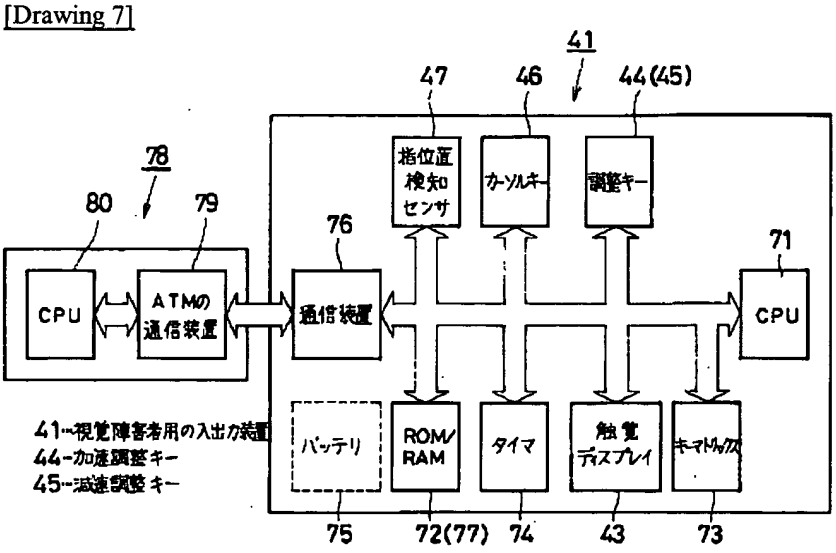
62,63… 文字列データ

[Drawing 12]



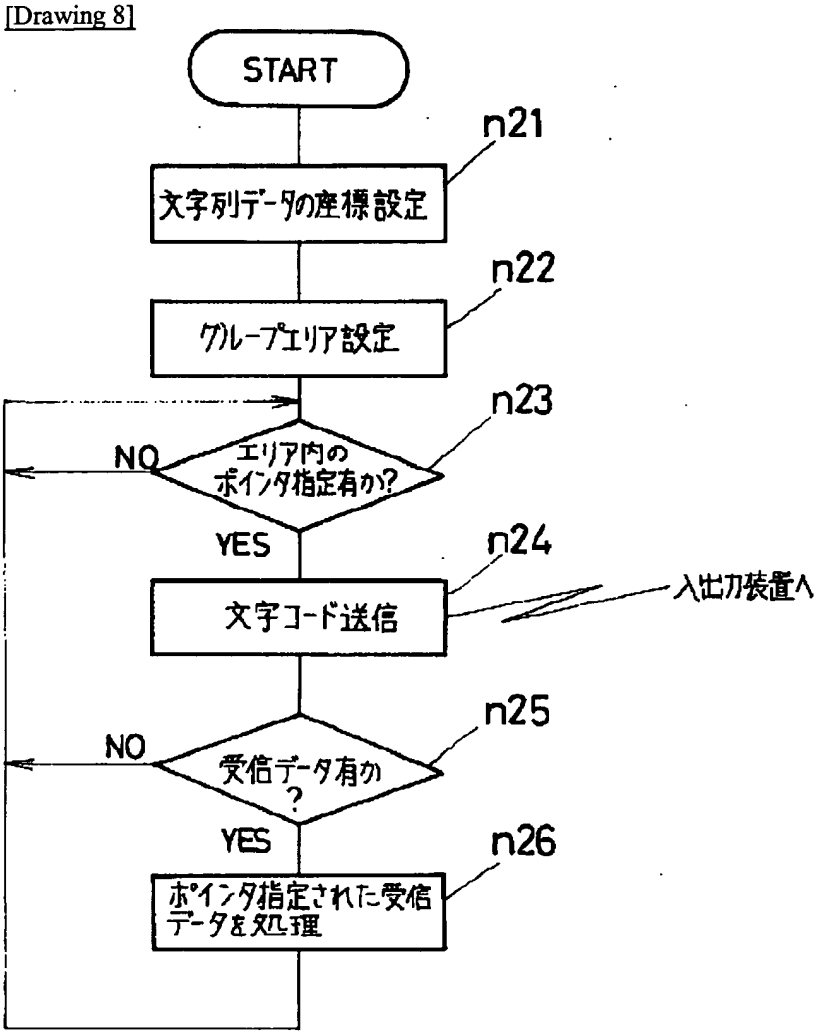
106…トラックボール

[Drawing 7]

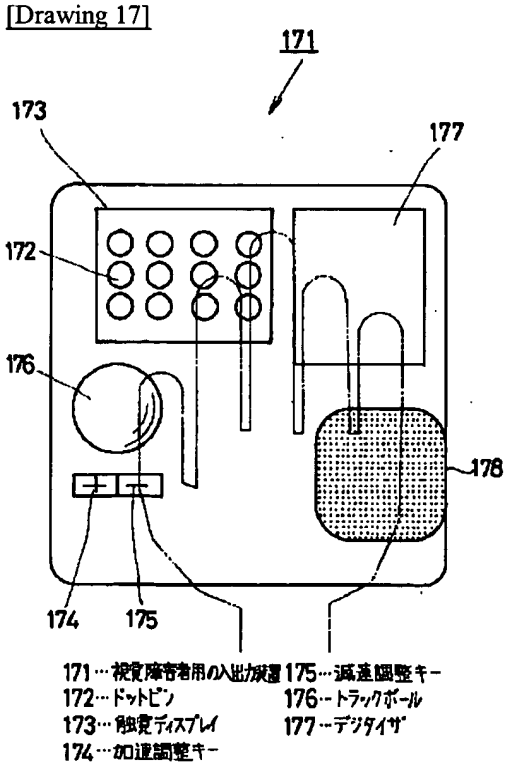


41…視覚障害者用の入出力装置
44…加速調整キー
45…減速調整キー

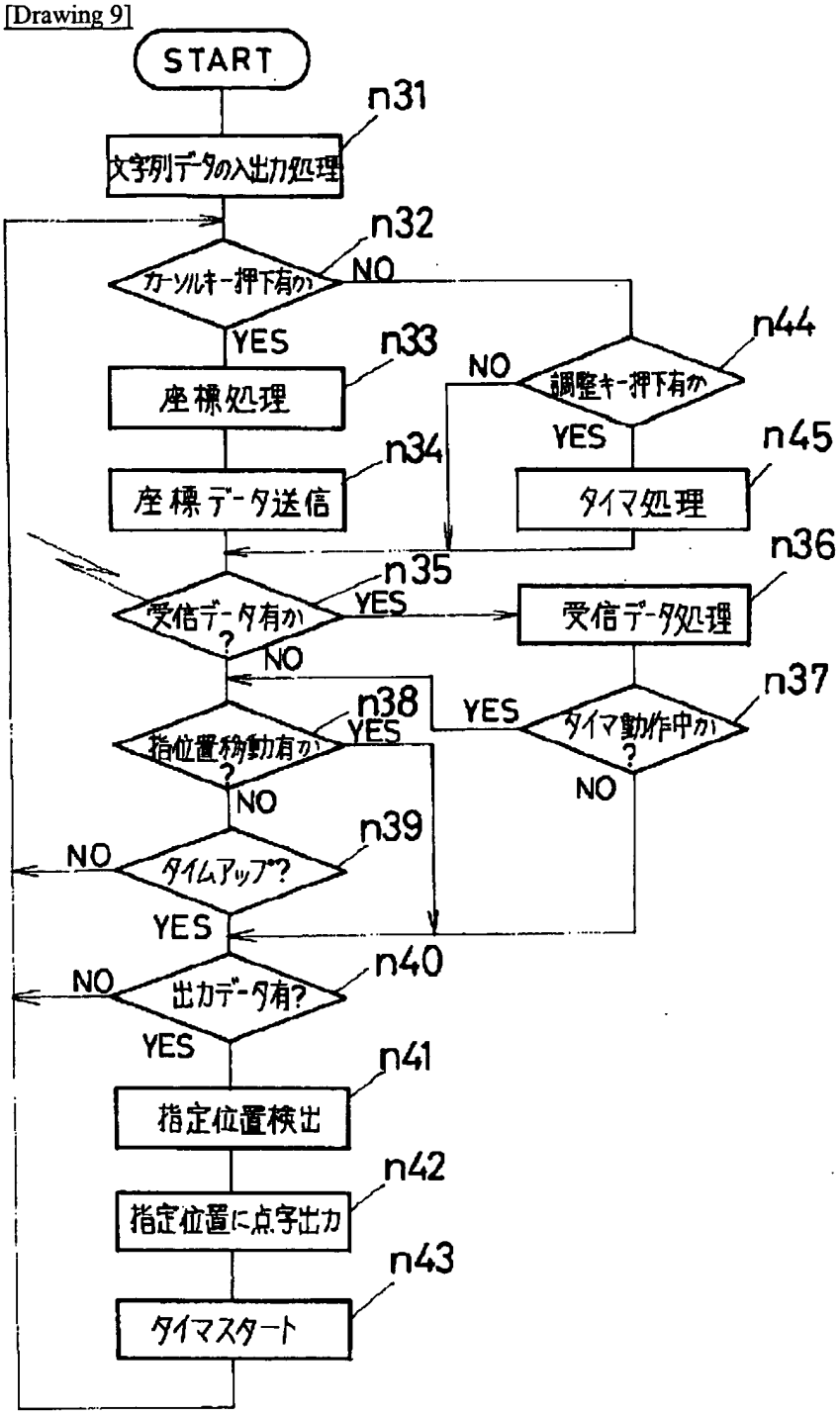
[Drawing 8]



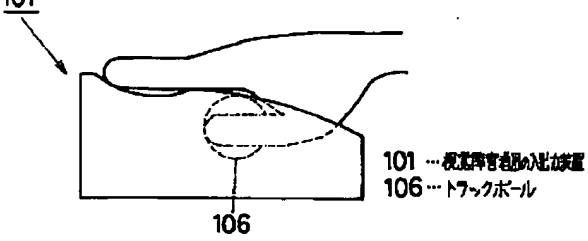
[Drawing 17]



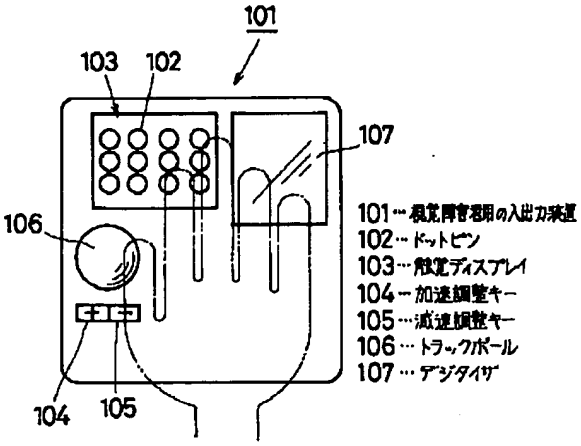
[Drawing 9]



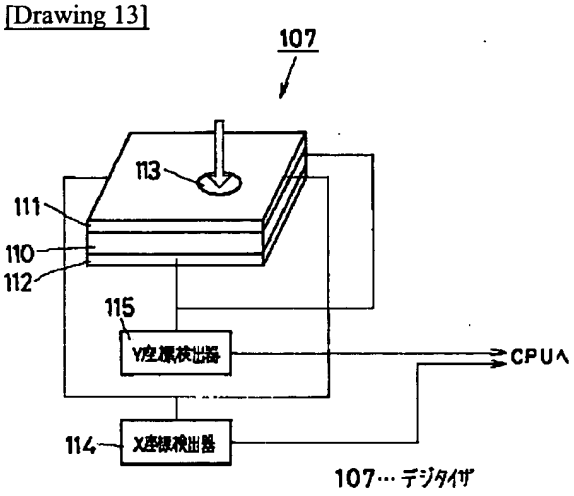
[Drawing 11]



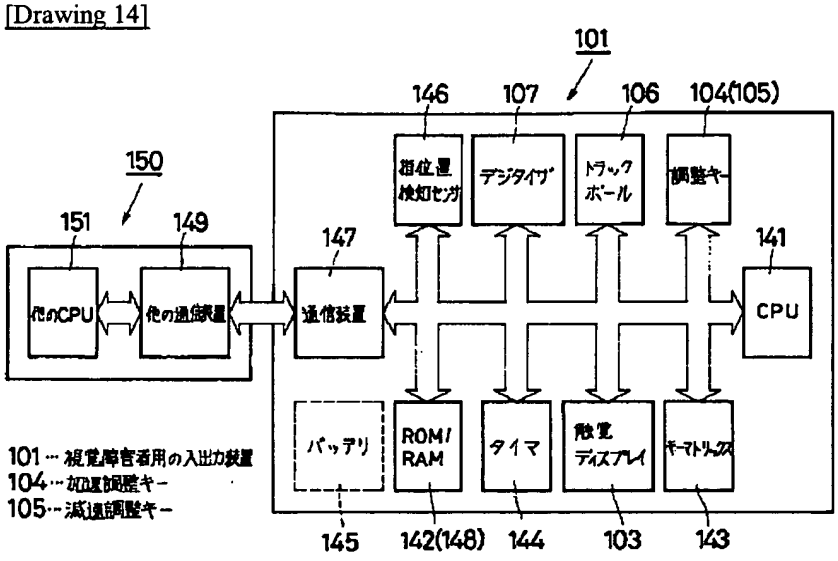
[Drawing 10]



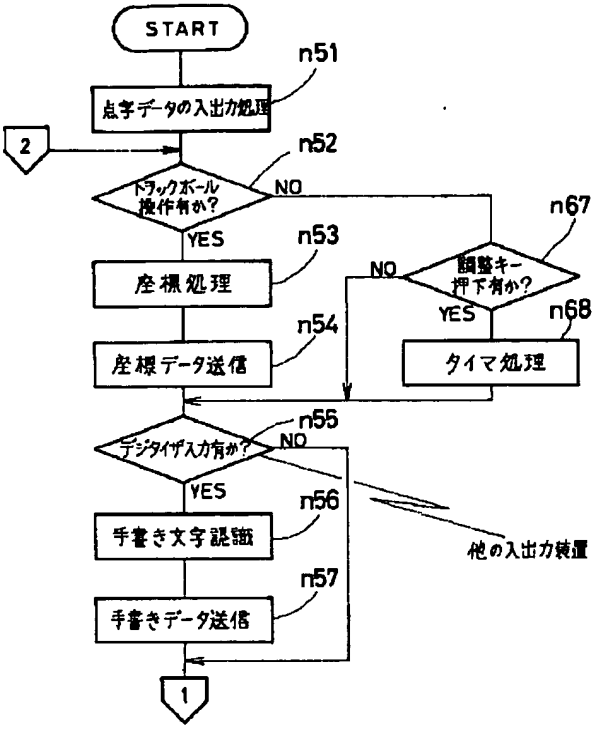
[Drawing 13]



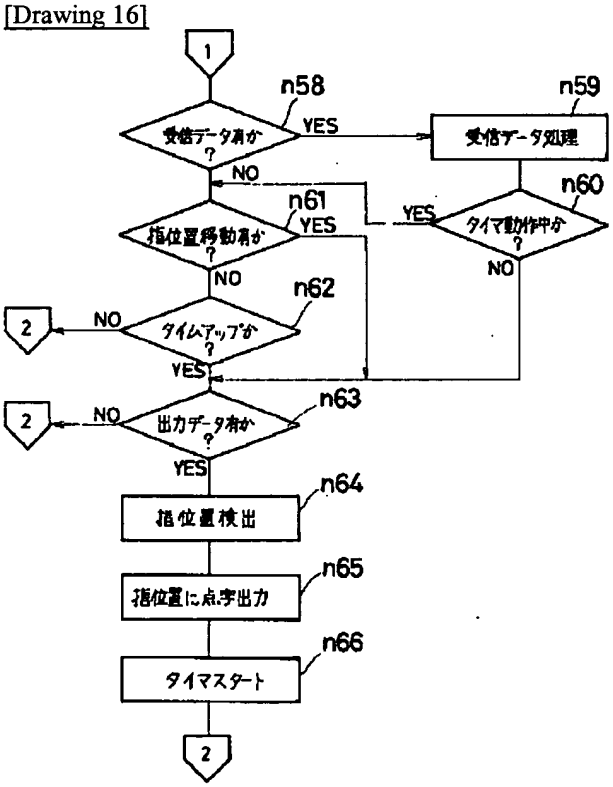
[Drawing 14]



[Drawing 15]



[Drawing 16]



[Translation done.]

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